

VELU PRABHAKAR KUMARAVEL

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EDUCATION

Fondazione Bruno Kessler, Trento, Italy *November 2018 - Present*
PhD Candidate in Cognitive and Brain Sciences

University of Bologna, Bologna, Italy *September 2015 - March 2018*
M.Sc. in Telecommunications Engineering
Thesis: Experimental Evaluation of BITalino: A Low-cost Modular Platform for Biosignals Acquisition

Madras Institute of Technology, Chennai, India *August 2008 - May 2012*
B.E. in Electronics and Communications Engineering
Thesis: Biomedical Image Segmentation using Combined Watershed and Level Set Method

INDUSTRIAL EXPERIENCE

Software Engineer *May 2013 - Sep 2015*
Larsen & Toubro, Chennai, India

- Design & Development of Microsoft-based Desktop Applications using C#.NET and SQL Server.

SKILLS SUMMARY

Languages	MATLAB, Python, Embedded C, \LaTeX , C#.Net, SQL Server
Tools	EEGLAB, FieldTrip, Brainstorm, MNE Python, Scikit, PyTorch, GitHub
Platforms	Windows, Linux, STM32
IDEs	Eclipse, PyCharm, Visual Studio Code
Soft Skills	Research, Critical Thinking, Written Communication, Collaboration

FUNDED RESEARCH PROJECTS

Researcher in NeuroSoNew: Portable EEG-based screening of social predispositions in newborns
ERC-2018-PoC - ERC Proof of Concept Grant of EUR 149,945 (ID: 842243) *November 2019 - Present*

Earlier studies revealed that newborns with Autism-Spectrum Disorders (ASD) demonstrate different preferences to face processing compared to the healthy populations. This project aims at designing a portable EEG for a rapid & reliable investigation of neural correlates of face processing in newborns to assist an early diagnosis of ASD.

My role on this project is to develop advanced signal processing tools for pre-processing and extracting the neural features from the offline newborn data. I also collaborate with researchers from the University of Bologna to port the solutions in the resource-constrained MCU platform.

PUBLICATIONS

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- “Book Chapter - Biomedical Signal Analysis 1 in Health Monitoring Systems (1st Edition), CRC Press, 2019”
DOI: [10.1201/9780429113390-6](https://doi.org/10.1201/9780429113390-6).
 - “Efficient Artifact Removal from Low-Density Wearable EEG using Artifacts Subspace Reconstruction”, *In press*, IEEE EMBC Conference, 2021.
 - “NEAR: An artifact removal pipeline for human newborn EEG data”, *Submitted for review*, Journal of Developmental Cognitive Neuroscience (DCN), 2021.
 - “Towards a Domain-specific Neural Network Approach for EEG Bad Channel Detection”, *Submitted for review*, IEEE Signal Processing in Medicine and Biology (SPMB), 2021.
 - “A Robust Bad Channel Detection Approach for EEG based on Local Outlier Factor (LOF) Algorithm”, *In preparation*, Target Journal: *Annals of Biomedical Engineering*.
 - “FTA: a toolbox for the analysis, source reconstruction and visualization of EEG responses in frequency-tagging designs adapted to developmental data”, *In preparation*, Target Journal: *Journal Of Neuroscience Methods*.

HONORS AND AWARDS

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- **Best Poster Award** (Jan, 2021) at Center for Mind/Brain Sciences, University of Trento, Italy ([link](#)).

- Winner of **Unibo Azione - 1** Grant for the year 2015 & 2016 assigned for the international master students at University of Bologna, Italy.

SCHOOLS/TRAINING

- 1st Mobile Brain/Body Imaging (MoBI) Workshop (2021)
- 9th International Summer School in Biomedical Engineering (2020)
- 29th EEGLAB Workshop (2019)

CO-SUPERVISED THESES

Michele Brugnara

Internship and Master's Thesis

Short Abstract: EEG is prone to artifacts of several kinds. Traditionally, detecting and removing 'bad' electrodes is often the first step. While there are a few automated algorithms based in EEGLAB and MNE-Python toolboxes, an objective Neural Network (NN) approach is still missing. The main objective of this thesis work is to explore the appropriate NN architectures to efficiently detect bad channels in a given EEG.

REVIEWER FOR INTERNATIONAL JOURNALS AND CONFERENCES

- IEEE EMBC Conference
- Journal of Neural Engineering
- Journal of Psychophysiology